

CLAIMS

1. A liquid crystal display device comprising a pair of substrates, at least one of which is transparent; a group of electrodes formed on at least one of the pair of substrates and adapted to apply an electric field to a liquid crystal layer disposed between the pair of substrates, the electric field having a component substantially parallel to the surfaces of the substrates; and an alignment layer disposed between the liquid crystal layer and at least one of the pair of substrates and having been subjected to liquid crystal anchoring treatments in plural directions, the liquid crystal display device being characterized in that the plurality of liquid crystal anchoring directions of the alignment layer form substantially equal angles relative to one another on the corresponding substrate surface; and a rising angle in each of the liquid crystal anchoring directions with respect to the corresponding substrate surface is substantially zero.
2. A liquid crystal display device comprising a pair of substrates, at least one of which is transparent; a group of electrodes formed on at least one of the pair of substrates and adapted to apply an electric field to a liquid crystal layer disposed between the pair of substrates, the electric field having a component substantially parallel to the surfaces of the substrates; and an alignment layer disposed between the liquid crystal layer and at least one of the pair of substrates and having been subjected to liquid crystal

anchoring treatments in two directions, the liquid crystal display device being characterized in that the two liquid crystal anchoring directions of the alignment layer form an angle of about 90° on the corresponding substrate surface; and a rising angle in one liquid crystal anchoring direction with respect to the corresponding substrate surface is substantially zero, and a rising angle in the other liquid crystal anchoring direction with respect to the corresponding substrate surface is not substantially zero.

3. A liquid crystal display device according to claim 1 or 2, characterized in that at least one of the liquid crystal anchoring treatments in the plural directions is a process for performing uniform anchoring treatment over an entire target area in each of the directions.

4. A liquid crystal display device according to claim 1 or 2, characterized in that at least one of the liquid crystal anchoring treatments in the plural directions is a process for dividing an entire target area into plural sub-areas corresponding to the plural directions and performing anchoring treatment in each of the sub-areas in the corresponding direction.

5. A liquid crystal display device according to claim 1, 2, 3, or 4, characterized in that at least one of the liquid crystal anchoring treatments in the plural directions is a process for irradiating the alignment layer with linearly polarized light that can cause a chemical reaction on the surface of the corresponding substrate.

6. A liquid crystal display device according to claim 1, 2, 3, or 4, characterized in that at least one of the liquid crystal anchoring treatments in the plural directions is a process for scanning the alignment layer with a probe that can impart stress to the surface of the corresponding substrate.
7. A liquid crystal display device according to claim 1, 2, 3, or 4, characterized in that at least one of the liquid crystal anchoring treatments in the plural directions is a process for scanning the alignment layer with light that can cause a chemical reaction on the surface of the corresponding substrate.
8. A liquid crystal display device according to claim 1, 2, 3, 4, 5, 6, or 7, characterized in that the liquid crystal layer is formed of a liquid crystal material which contains chiral molecules as a component.
9. A liquid crystal display device according to claim 1, 2, 3, 4, 5, 6, 7, or 8, characterized in that the liquid crystal layer is formed of a liquid crystal material whose dielectric anisotropy becomes positive or negative depending on the frequency of an applied AC electric field.
10. A liquid crystal display device according to claim 1, 2, 3, 4, 5, 6, 7, 8, or 9, characterized in that in addition to the group of electrodes for applying to the liquid crystal layer an electric field having a component substantially parallel to the surfaces of the substrates, an electrode is disposed on each of the pair of substrates in such a manner

that the electrodes provided on the pair of substrates form a pair.

11. A liquid crystal display device according to claim 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, characterized in that a light reflection plate is disposed on one of the pair of substrates.